

In the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application. Claim 1-19 were withdrawn previously. Claims 24-26, 29, 37-39 and 42 were cancelled in a previous amendment. Claim 20-23 and 33-35 are cancelled by this amendment.

1-19 (withdrawn)

20. (cancelled)

21. (cancelled)

22. (cancelled)

23. (previously presented) A method of pose estimation for a plurality of regions based on a multiple fiducial pattern having a grid of main fiducials, the method comprising:

calculating a plurality of parameters for one or more 5D poses of each region to generate a plurality of 5D poses by

calculating a pose normal for each 5D pose; and

calculating a pose center for each 5D pose;

grouping the 5D poses into one or more planar groups by

creating a set of planar groups wherein each planar group has a plane normal and a plane point; and

assigning each 5D pose to a planar group based on the pose normal, the plane normal, the pose center and the plane point;

selecting the planar group with the most members as the plane of the multiple fiducial pattern and

adding a new planar group to the set of planar groups when a current 5D pose does not fit any planar group of the set of planar groups.

24. (cancelled)

25. (cancelled)

26. (cancelled)

27. (previously presented) The method of Claim 23, wherein the plane normal of the new planar group is set equal to the pose normal of the current 5D pose.

28. (previously presented) The method of Claim 23 wherein the plane point of the new planar group is set equal to the pose center of the current 5D pose.

29. (cancelled)

30. (previously presented) A method of pose estimation for a plurality of regions based on a multiple fiducial pattern having a grid of main fiducials, the method comprising:

calculating a plurality of parameters for one or more 5D poses of each region to generate a plurality of 5D poses;

grouping the 5D poses into one or more planar groups;

selecting the planar group with the most members as the plane of the multiple fiducial pattern;

calculating a center difference between each pair of 5D poses to form a plurality of center differences; and

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orienting the multiple fiducial pattern based on the 5D poses with a center distance that most closely equals a grid distance of the multiple fiducial pattern by

assigning the center difference whose length most closely equals a grid distance as a first direction of the multiple fiducial pattern; and

assigning a cross product of the first direction with a plane normal as a second direction of the multiple fiducial pattern.

31. (original) The method of Claim 23, further comprising using identifying features to match one or more regions of the plurality of regions to fiducials in the multiple fiducial pattern.

32. (original) The method of Claim 31, wherein the identifying features provide orientation information.

33. (cancelled)

34. (cancelled)

35. (cancelled)

36. (previously presented) A system of pose estimation for a plurality of regions based on a multiple fiducial pattern having a grid of main fiducials, the system comprising:

means for calculating a plurality of parameters for one or more 5D poses of each region to generate a plurality of 5D poses having:

means for calculating a pose normal for each 5D pose; and

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means for calculating a pose center for each 5D pose.

means for grouping the 5D poses into one or more planar groups having:

means for creating a set of planar groups wherein each planar group has a plane normal and a plane point; and

means for assigning each 5D pose to a planar group based on the pose normal, the plane normal, the pose center and the plane point;

means for selecting the planar group with the most members as the plane of the multiple fiducial pattern; and

means for adding a new planar group to the set of planar groups when a current 5D pose does not fit any planar group of the set of planar groups.

37. (cancelled)

38. (cancelled)

39. (cancelled)

40. (previously presented) The system of Claim 36, wherein the plane normal of the new planar group is set equal to the pose normal of the current 5D pose.

41. (previously presented) The system of Claim 36, wherein the plane point of the new planar group is set equal to the pose center of the current 5D pose.

42. (cancelled)

43. (previously presented) A system of pose estimation for a plurality of regions based on a multiple fiducial pattern having a grid of main fiducials, the system comprising:

means for calculating a plurality of parameters for one or more 5D poses of each region to generate a plurality of 5D poses;

means for grouping the 5D poses into one or more planar groups;

means for selecting the planar group with the most members as the plane of the multiple fiducial pattern.

means for calculating a center difference between each pair of 5D poses to form a plurality of center differences; and

means for orienting the multiple fiducial pattern based on the 5D poses with a center distance that most closely equals a grid distance of the multiple fiducial pattern having

means for assigning the center difference whose length most closely equals a grid distance as a first direction of the multiple fiducial pattern; and

means for assigning a cross product of the first direction with a plane normal as a second direction of the multiple fiducial pattern.

44. (original) The system of Claim 36, further comprising means for using identifying features to match one or more regions of the plurality of regions to fiducials in the multiple fiducial pattern.

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45. (original) The system of Claim 44, wherein the means for identifying features provide orientation information.